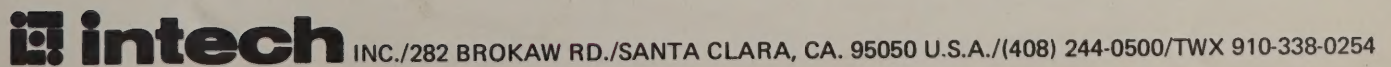


SUBJECT: Mariner 500 Microphone Circuit

PAUC
BILL
TRAH FILE



1. GENERAL INFORMATION

1.1 DESCRIPTION

The Mariner 1600 is a compact, all solid-state, 150W PEP, HF SSB Transceiver for the Marine and HF Radio Service.

The set covers the frequency range from 2 to 23MHz with no frequency restrictions on receive or transmit. The channel capacity is 12 semi-duplex or 24 simplex or any combination. The upper sideband is transmitted. The channel frequencies are controlled by precision crystals that are housed in a proportional controlled crystal oven. Programming of each channel is accomplished with slide switches. A separate filter is used to allow true AM reception on so programmed channels. The transceiver works off a 12V DC negative ground system. The RF impedance is 50 ohms and is compatible with the Mariner 1605 Antenna Coupler or trap antennas.

1.2 EQUIPMENT FURNISHED

1.2.1 Mariner 1600 Radiotelephone.

1.2.2 Microphone and Microphone Clip.

1.2.3 Mounting Bracket.

1.2.4 6-Pin Power Connector (P/N 1430 5039).

1.2.5 18-Pin Control Connector to Antenna Coupler (P/N 1430 5038).

1.2.6 Instruction and Maintenance Manual.

1.2.7 Sheet of Frequency Markers (P/N 5315 7037).

1.3 OPTIONS AND ACCESSORIES

1.3.1 Crystals, one per channel (Intech Crystal Specification 1616 XXXX).

1.3.2 Power Supplies: PS135 115/220V AC, 13.6V DC, 20 Amps
PS136 20 to 50V DC, 13.6V DC, 20 Amps

1.3.3 Antenna Coupler, Mariner 1605.

1.3.4 Handset, H177.

1.3.5 Control Cable, #22 Gauge, 20 Wires (P/N 3640 0007).

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1.3.6 Power Cable #8 Gauge, 2 Wires (P/N 3640 0006).

1.4 MECHANICAL INFORMATION

Size: 40.6cm W x 14cm H x 35.6cm D
16" W x 5.5" H x 14" D

Weight: 8.2 kgs. or 18 lbs.

Mounting Position: Any Orientation

1.5 ELECTRICAL SPECIFICATION

1.5.1 GENERAL

| | |
|-----------------------------|---|
| Type Acceptance | FCC Parts 81, 83, 89, 91 |
| Frequency Range | 2 to 23MHz |
| Circuitry | Dual Conversion (45MHz, 455kHz) |
| Channel Capacity | 24 Simplex or 12 Semi-duplex or any combination. |
| Front Panel Controls | Volume ON/OFF, Clarifier, Squelch/RF Gain, AM/SSB, A/B Channel, Channel Selector. |
| Operating Temperature Range | -30 to +60°C |
| Frequency Stability | 20Hz |
| Operating Modes | A3A, (SSB -16dB Carrier) A3H, (AME -3 to -6dB Carrier) A3J, (SSB -40dB Carrier) |
| Primary Voltage | 13.6V DC $\pm 15\%$, Negative Ground |
| Current Drain | |
| Receive Standby | 1A |
| Receive Full Audio | 1.5A |
| Transmit Average Voice | 10A |
| Transmit Two Tone | 18A |
| RF Impedance | 50 Ohms |

1.5.2 TRANSMITTER

| | |
|-------------------------------|-----------------------------------|
| Power Output (into 50 Ohms) | A3A, A3J, 150W PEP A3H 40W PEP |
| Intermodulation | -32dB below PEP |
| Spurious Emmissions | -64dB below PEP |
| Carrier Supression | -46dB below PEP (A3J) |
| Undesired Sideband Supression | -60dB below PEP |
| Audio Response | 300Hz to 2400Hz, ± 3 dB |

1.5.3 RECEIVER

| | | |
|------------------------------------|-----------|---|
| Sensitivity: | SSB AM | 1 μ V for 12dB SINAD, 500mV Audio 3 μ V for 12dB SINAD, 500mV Audio |
| Selectivity: | SSB AM | -6dB 300Hz to 2400Hz, -60dB @ 4kHz -6dB @ \pm 6kHz, -60dB @ \pm 16kHz |
| AGC | | Audio output varies less than 10dB for signals between 10 μ V and 100mV, fast attack, slow release. |
| Intermodulation | | At least -80dB |
| Spurious Responses (incl. Image) | | At least -60dB |
| Clarifier, uniform on all channels | | \pm 150Hz |
| Noise Limiter | | Diodes |
| Audio Power | | 4 watts at less than 10% distortion |

1.4 FRONT PANEL CONTROLS AND INDICATORS

Figure 1 illustrates the front panel of the Mark 100. The function of these controls are as follows:

Volume Control: This control adjusts the loudness of the received signal and can be set on or off. To tune the receiver, turn the frequency control knob clockwise until a signal is heard. Turning the volume knob further clockwise will increase the signal without distortion.

Frequency Control: This control varies the frequency of the receiver. It is used to tune the receiver to a particular frequency. When the control is set to 1000kHz, the frequency of the receiver is approximately 1000kHz. The frequency control is a pull-type knob which has a small notch at the 1000kHz mark which allows the operator to observe a small notch on the frequency scale. To adjust the frequency, pull the frequency control knob out.

Bandwidth Control: This control varies the bandwidth of the receiver. It is used to select the desired signal and reject unwanted signals. The bandwidth control is a pull-type knob which has a small notch at the 1000kHz mark which allows the operator to observe a small notch on the frequency scale. To adjust the bandwidth, pull the bandwidth control knob out.

Power Control: This control varies the power of the receiver. It is used to select the desired signal and reject unwanted signals. The power control is a pull-type knob which has a small notch at the 1000kHz mark which allows the operator to observe a small notch on the frequency scale. To adjust the power, pull the power control knob out.

Mode Control: This control varies the mode of the receiver. It is used to select the desired signal and reject unwanted signals. The mode control is a pull-type knob which has a small notch at the 1000kHz mark which allows the operator to observe a small notch on the frequency scale. To adjust the mode, pull the mode control knob out.

2 OPERATION

2.1 WARM-UP CAUTION

Do not attempt to transmit until the radiotelephone is warmed-up for at least 10 minutes. Transmitting before the 10 minute warm-up period has elapsed can cause a violation of FCC Regulations.

2.2 FCC REQUIREMENTS

Before a SSB radiotelephone can be licensed, a VHF radio set has to be installed. A valid ship station license, in addition to an operators license, is required to operate a radiotelephone. FCC forms #502 and #753A can be obtained from an Intech dealer or direct from the factory. Aliens can obtain form #755 from the nearest FCC office.

2.3 OPERATING PRACTICES, FCC PARTS 81 AND 83

"How to Correctly Operate Your Radio Telephone Set" is a booklet available from the Radio Technical Commission for Marine Service (RTCM), P.O. Box 19087, Washington, D.C. 20036 and is highly recommended reading material.

2.4 FRONT PANEL CONTROLS AND INDICATORS

Figure 1 illustrates the front panel of the Mariner 1600. The function of these controls are as follows:

Volume/Off: This control adjusts the loudness of the receiver and turns the set on and off. To turn the set ON, turn the Volume/Off control knob CLOCKWISE until a click is heard. Turning the control knob further clockwise will increase the receiver volume level.

Clarity/Lamp: This control varies the frequency of the receiver $\pm 150\text{Hz}$ to allow the operator to compensate for off-frequency signals. When the control is set to mid-range, the frequency of the receiver is approximately correct for that channel. The lamp control is a pull type switch on the clarity control knob which allows the operator to actuate a small panel lamp behind the channel frequency placard. To actuate the lamp, pull the clarity/lamp control knob out.

Squelch/RF Gain: This potentiometer sets the squelch threshold in the push-in position. With the control in the pull-out mode, the RF gain level can be set.

Note: At any one time only one of these functions can be exercised.

AM/SSB Switch: Allows the operator to receive AM or SSB on a A3H(AME) Channel. 2182 is the only legal A3H Channel in the U.S.

AME/SSB Switch: This control allows the operator to manually select either AME or SSB on any channel WHEN SUCH OPERATION IS INTERNALLY PROGRAMMED. This control is intended for those frequencies where both AM and SSB modes are allowed.

A/B Switch: This control is used to obtain two frequencies on one position of the channel selector. It is only operational when the channel is internally programmed for simplex operation.

Channel Selector: Used to select desired operating frequency.

Frequency Display: Indicates the station (i.e., WOO 4-1) or frequencies associated with a particular selector position.

A Green and Yellow LED show whether the A or B frequency is in use on a particular switch position.

A Red Lamp behind the dial indicates that power has been applied to the transmit circuits.

Illumination for the window is provided by a light bulb activated by pulling the clarifier knob.

2.5 PROPAGATION

HF signals do propagate for beyond the horizon. MF frequencies (2-3MHz) are generally usable within 300 miles depending on the daytime, atmospheric and man-made noise.

The High-Seas frequencies (4, 6, 8, 12, 16, 22MHz bands) allow communications over thousands of miles, again subject to the above mentioned limitations. Interference tends to be more of a problem than on VHF.

2.6 OPERATING THE TRANSMITTER

The operation of the transmitter is fairly straight forward. Do not shout into the microphone as it will decrease intelligibility. Acknowledgement of a message cannot be done by keying the microphone since no signal is transmitted until the operator actually speaks.

